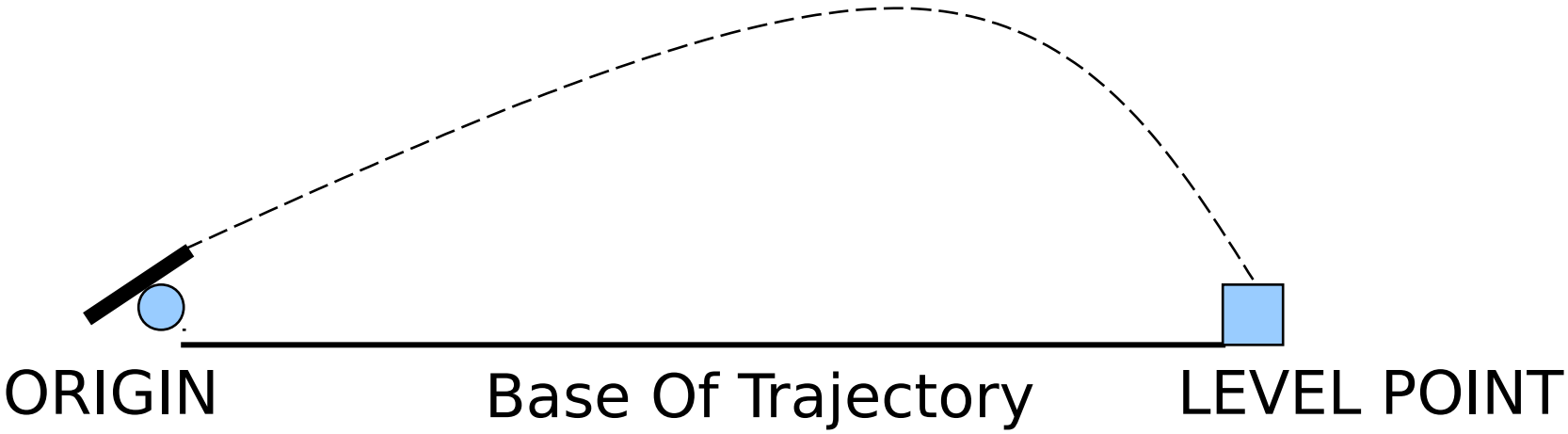
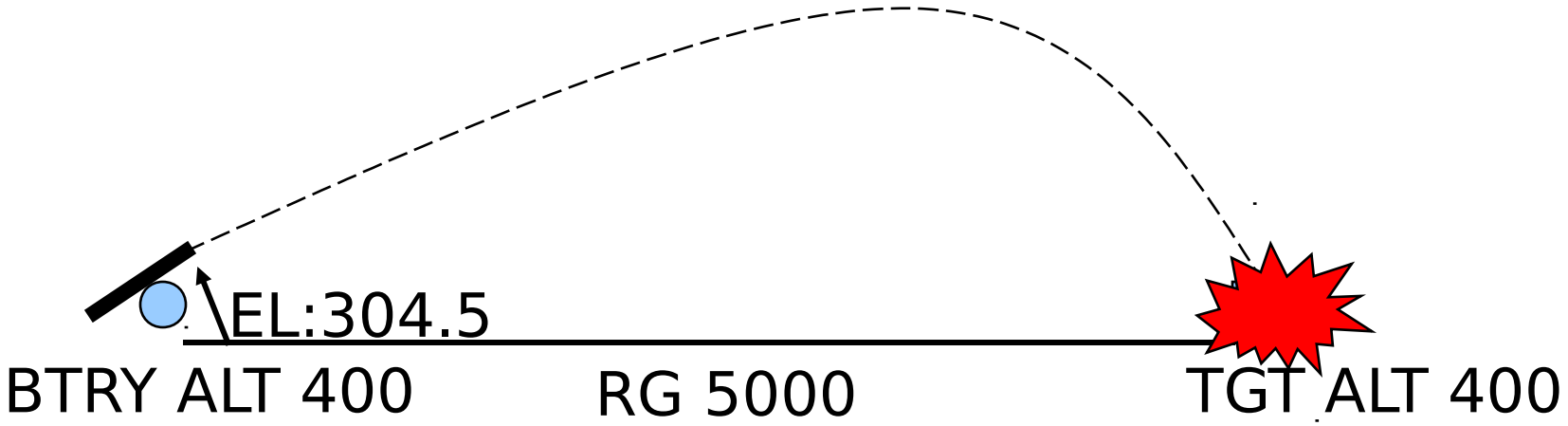
UNITED STATES MARINE CORPS FIELD ARTILERY FIRE CONTROLMANS COURSE

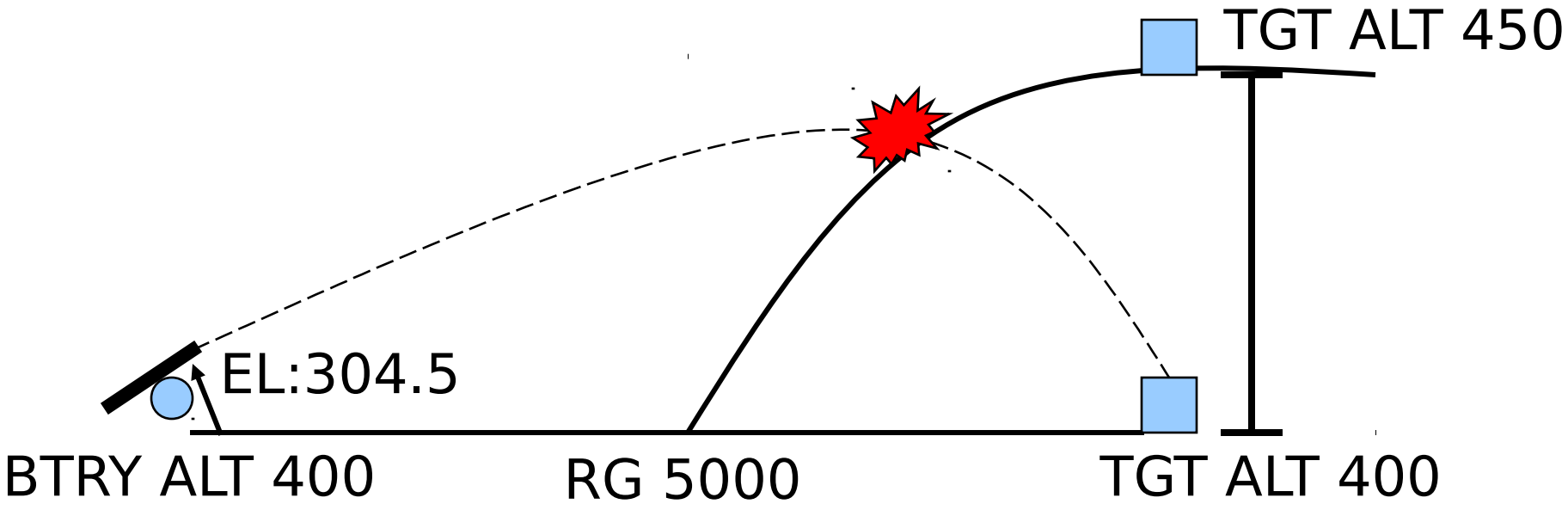
Firing a projectile with data from the tabular firing table
cause the projectile to leave the point of origin and trav
specific distance at which it will cross the base of the tra
at the level point **IF** all standard conditions exist.




EL:304.5
BTRY ALT 400
RG 5000
TGT ALT 400

Purpose: To enable the student to perform the duties of the Vertical Control Operator

Risk: Low


TGT ALT 450
EL:304.5
BTRY ALT 400
RG 5000
TGT ALT 400

THE VERTICAL CONTROL OPERATOR

DETERMINES VERTICAL INTERVAL

DETERMINES ANGLE OF SITE

DETERMINES COMPLIMENTARY ANGLE OF SITE

DETERMINES VERTICAL ANGLE

DETERMINES SITE

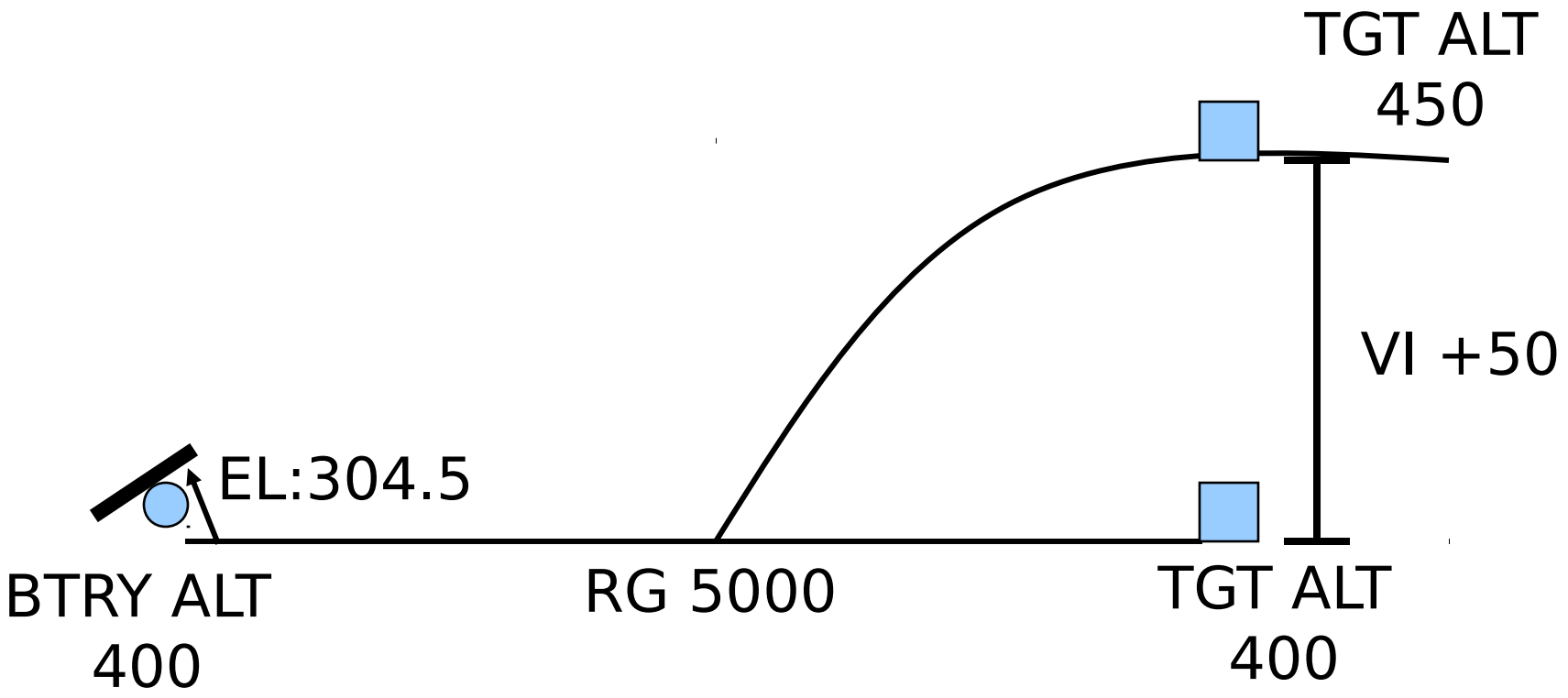
VERTICAL INTERVAL

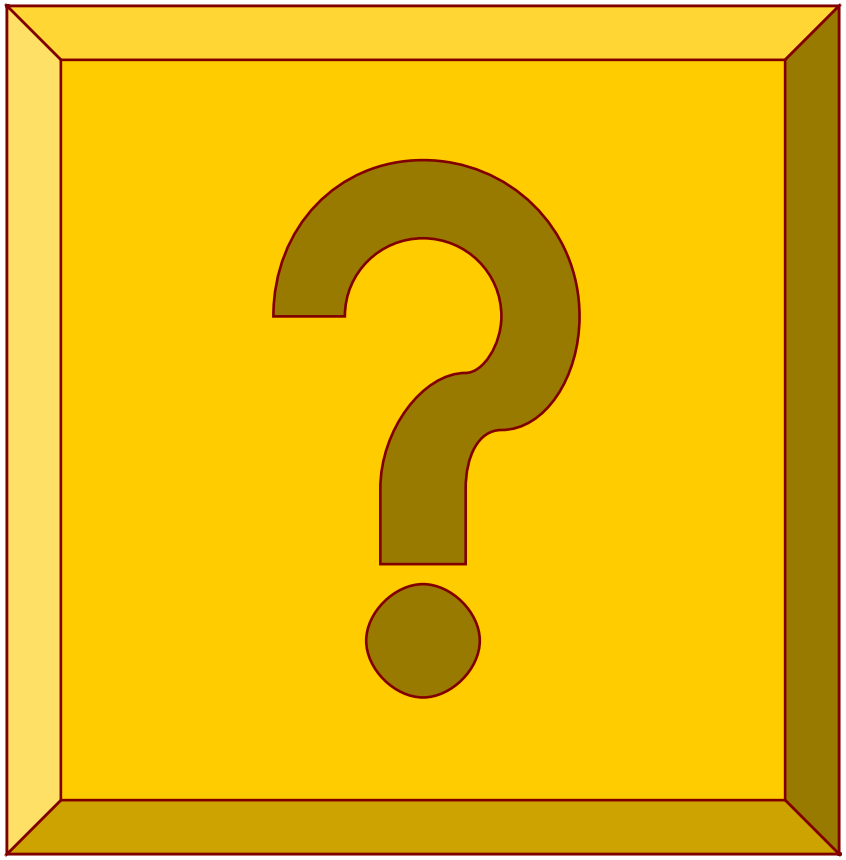
- Vertical interval is the difference in altitude between two specific points.
- Determined to the nearest meter
- It is a signed value (+/-)
- To determine sign, always subtract Btry from the Tgt.
- TGT ALT - BTRY ALT= VI

VERTICAL INTERVAL

TGT ALT - BTRY ALT= VI

450 - 400=50

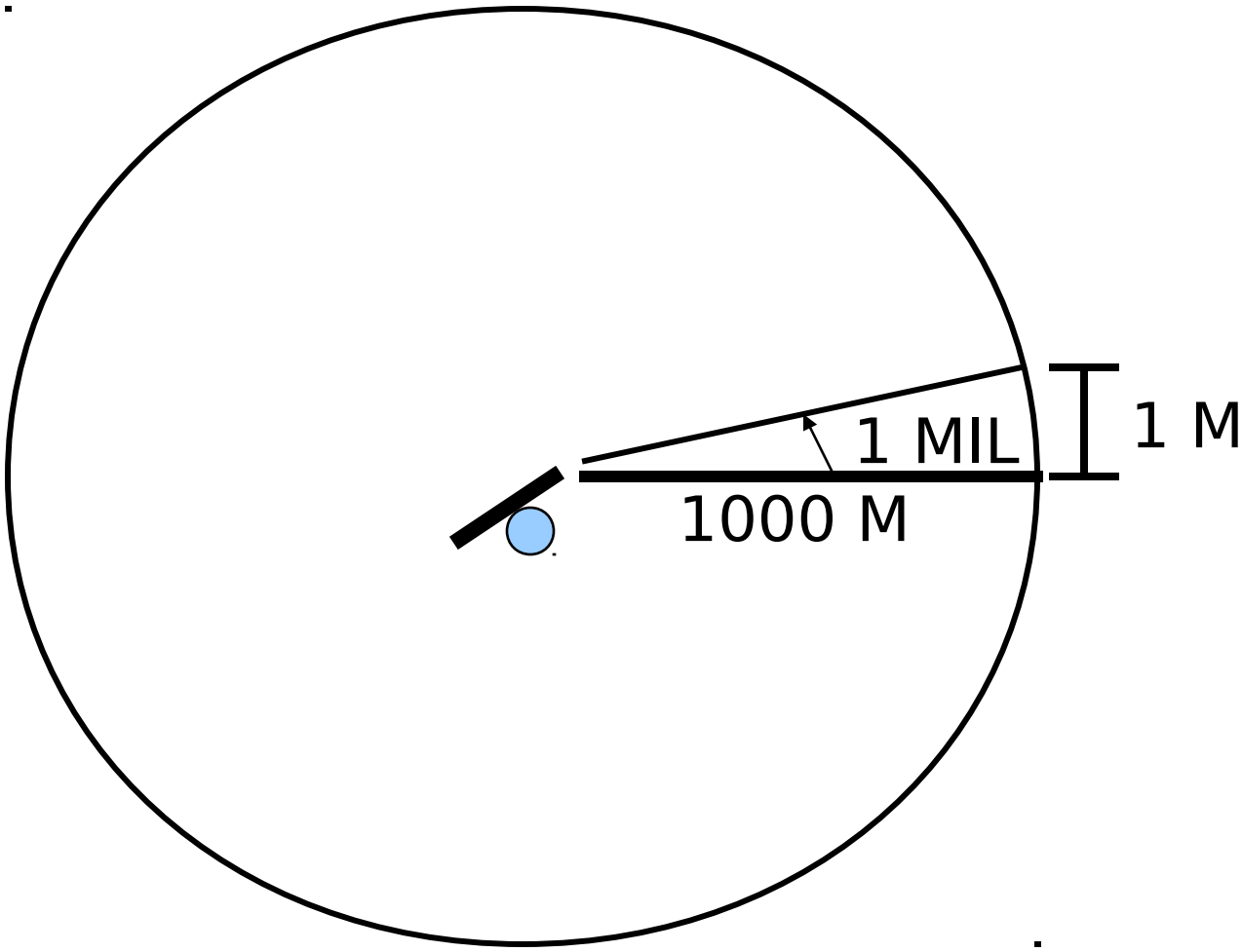




MIL RELATIONSHIP

- **Defines the relationship between the mil and linear distance**
- **A mil subtends one meter on the circumference of a circle with a radius of 1,000 meters**
- **FORMULA:** $\text{MIL} = \frac{\text{WIDTH}}{\text{RANGE}}$

MIL RELATIONSHIP FORMULA:
1 MIL=1 METER AT 1000 METERS



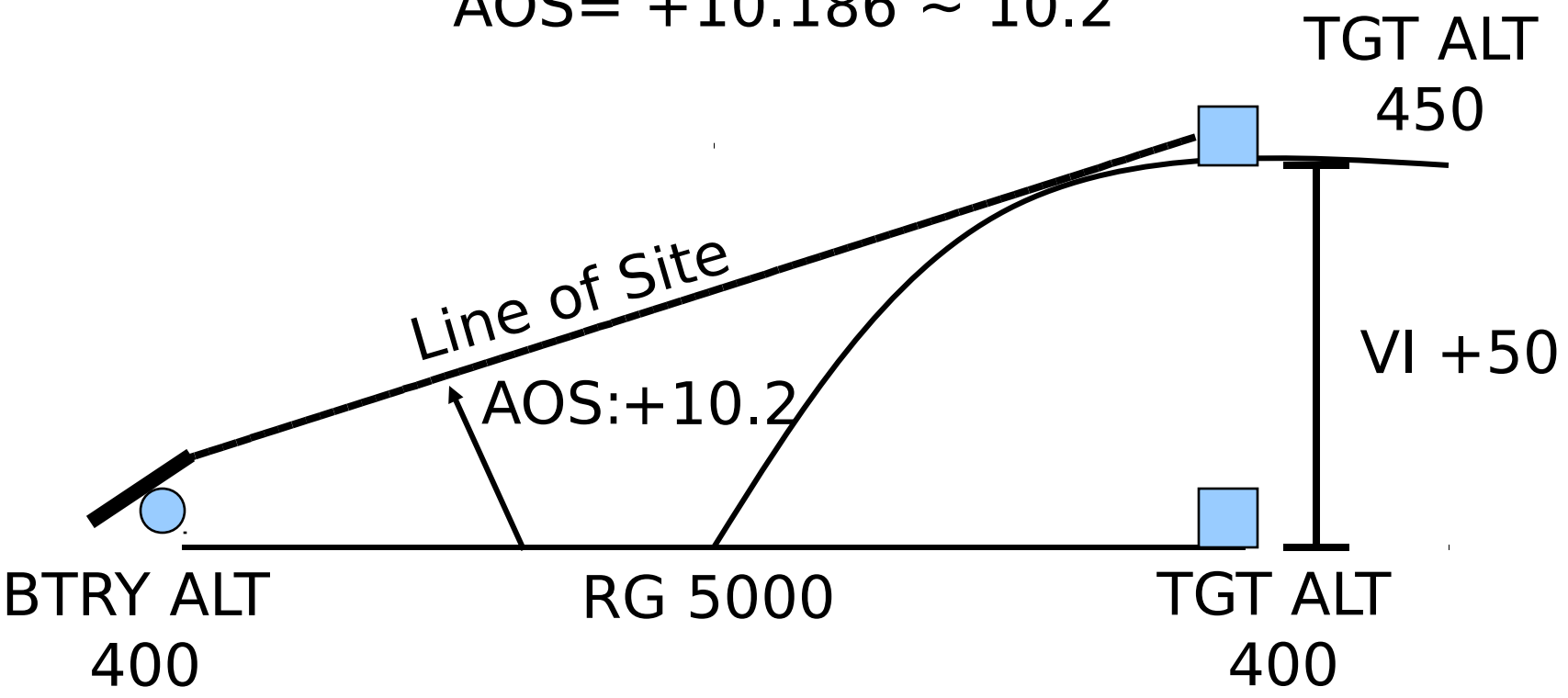
ANGLE OF SITE

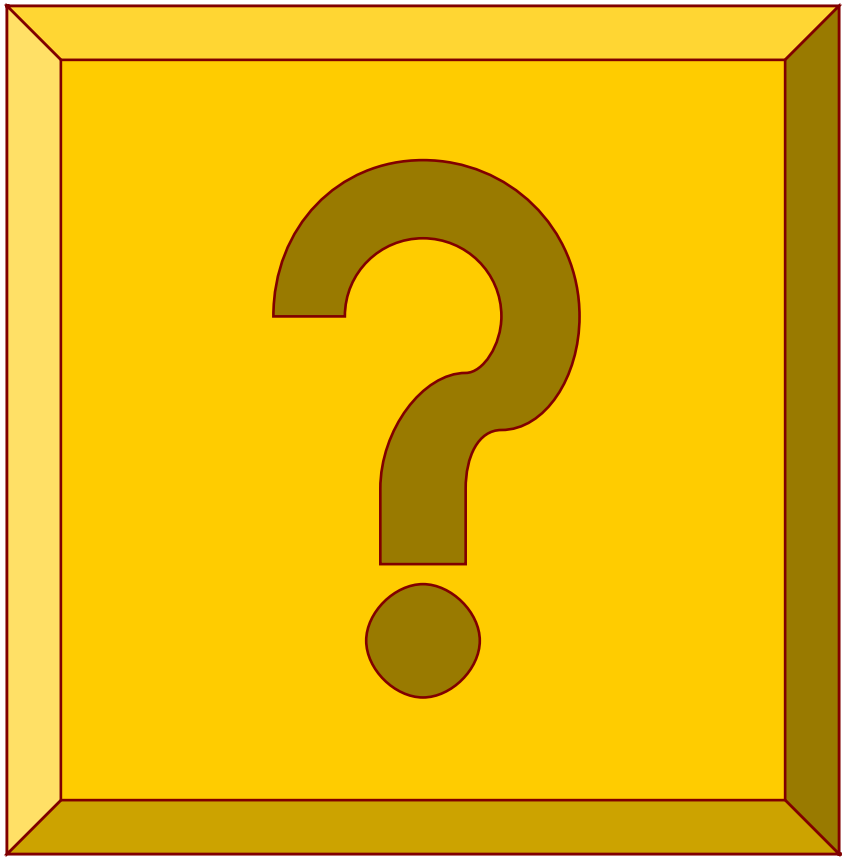
- **Compensates for the vertical interval**
- **Smaller angle in the vertical plane from the base of the trajectory to the straight line joining the origin and the target**
- **Determined to the nearest tenth of a mil**
- **Carries the sign of the vertical interval**
- **MAY NEVER EXCEED VI**
- **AOS=[VI/(RG/1000)]*1.0186**

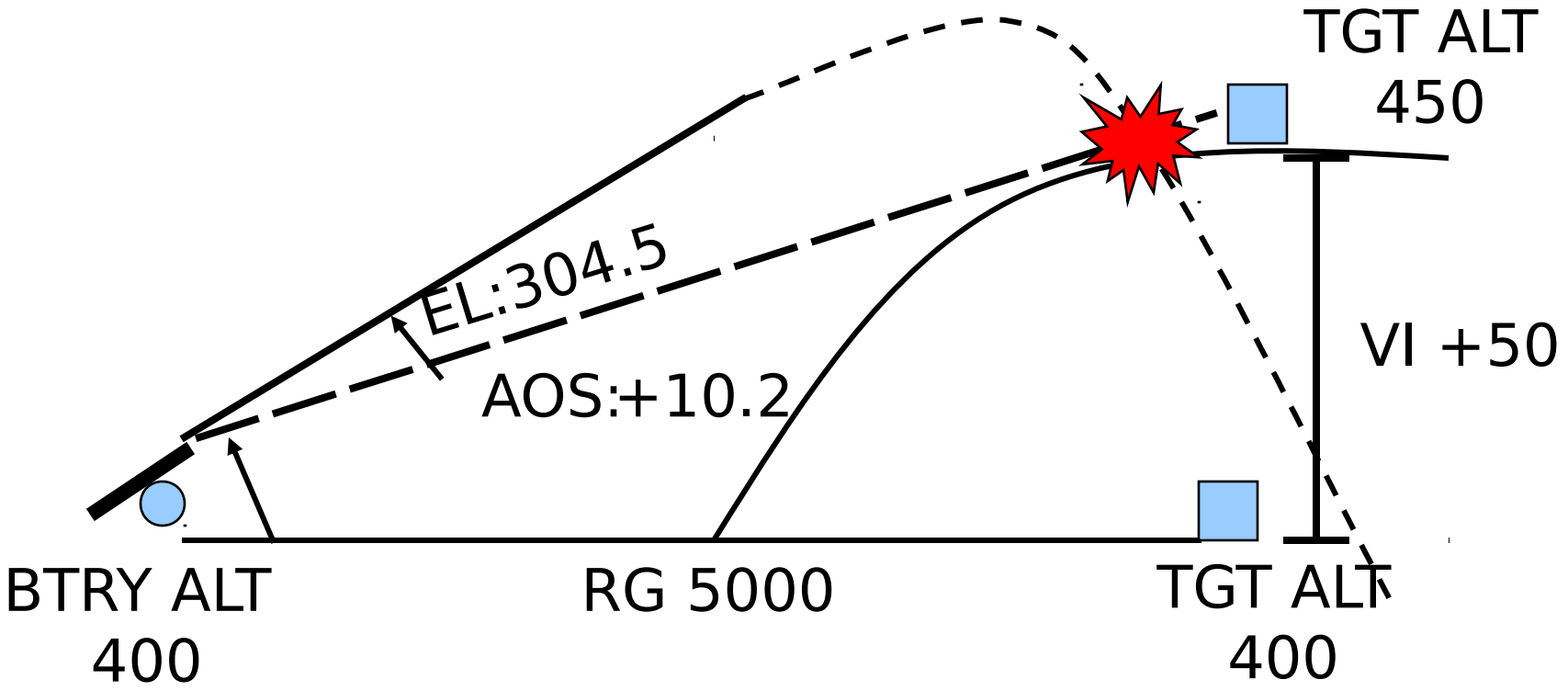
ANGLE OF SITE

AOS=[VI/(RG/1000)]*1.0186

AOS=[+50/(5000/1000)] *1.0186
AOS=[+50/5] *1.0186
AOS= +10 *1.0186
AOS= +10.186 ~ 10.2






TGT ALT
450
EL:304.5
AOS:+10.2
VI +50
BTRY ALT
400
RG 5000
TGT ALT
400

COMPLIMENTARY ANGLE OF SITE

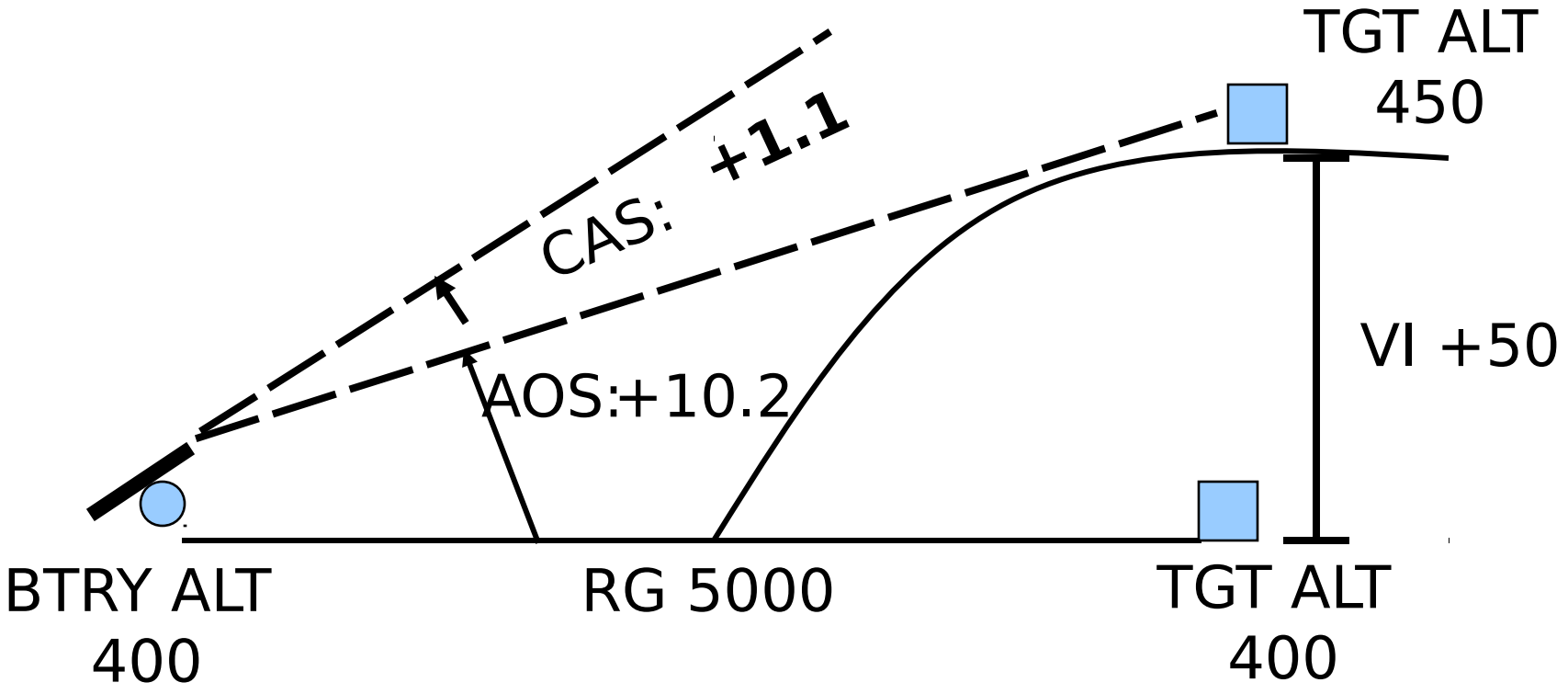
- **Complimentary angle of site is the angle that is algebraically added to the angle of site to compensate for the non-rigidity of the trajectory**
- **CAS is dependent on charge, range, angle of site, weapon system, projectile family, and angle of fire** (high or low angle)
- **CAS=AOS*CSF (table “G” col 12/13)**

COMPLIMENTARY ANGLE OF SITE

CAS=AOS*CSF

CAS=+10.2*.103

CAS=+1.0506 ~ +1.1

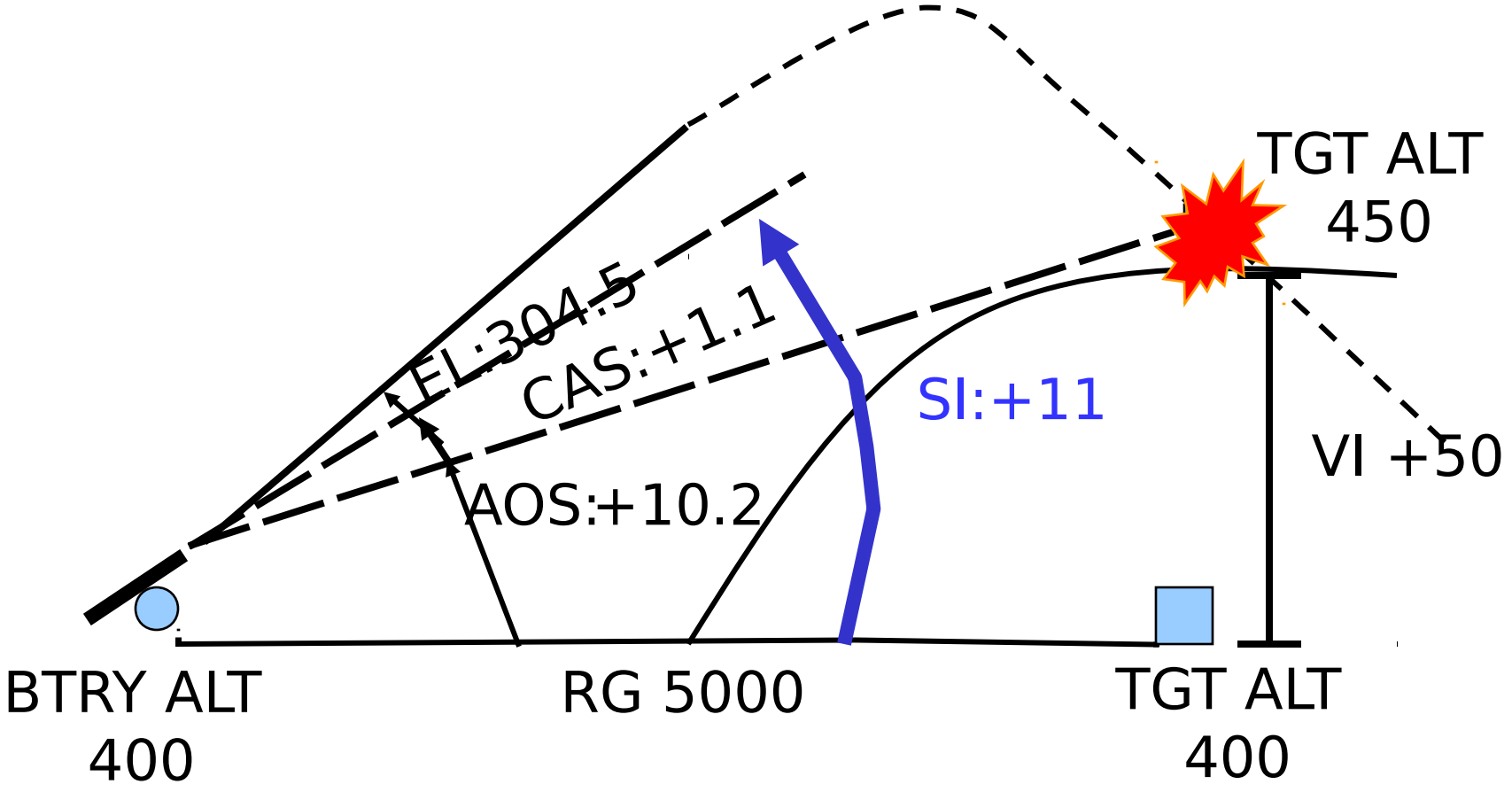


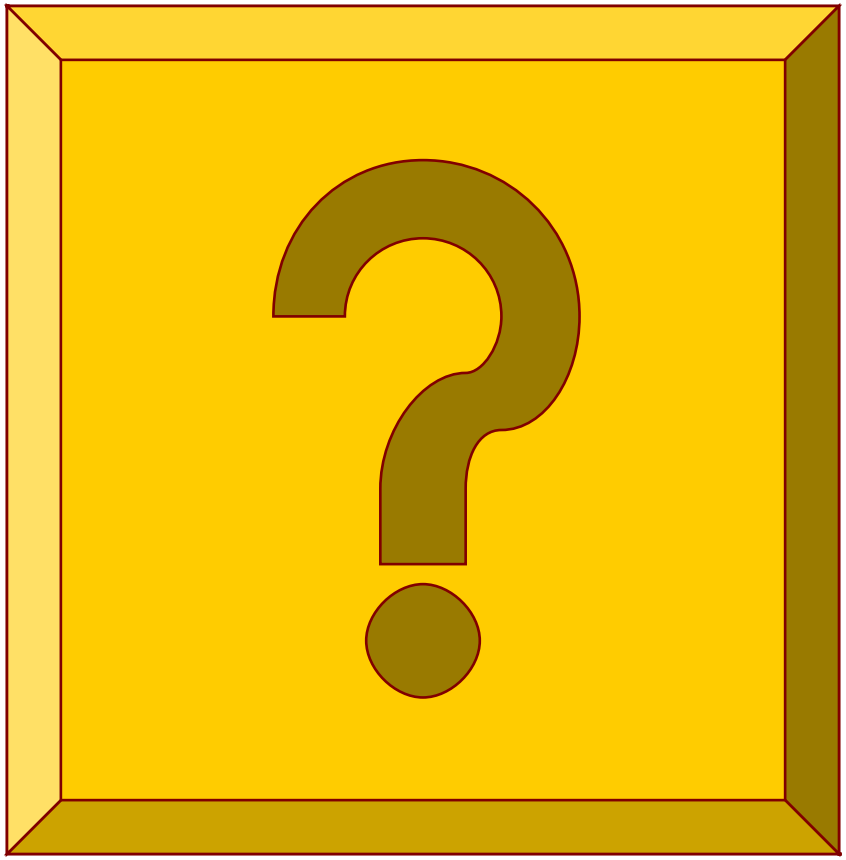
SITE= AOS + CAS

SI = (+10.2) + (+1.1)

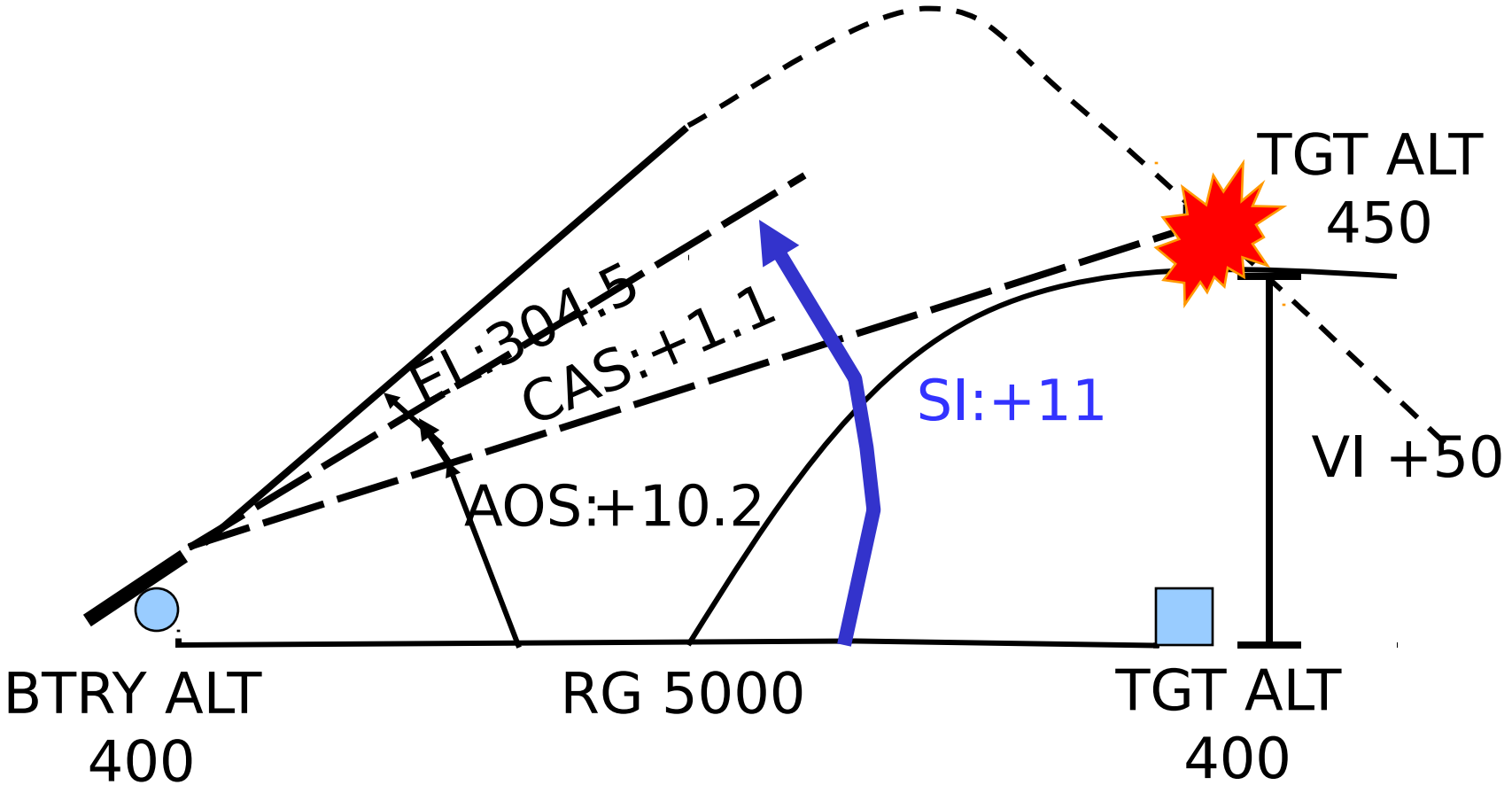
SI = +11.3 ~ +11

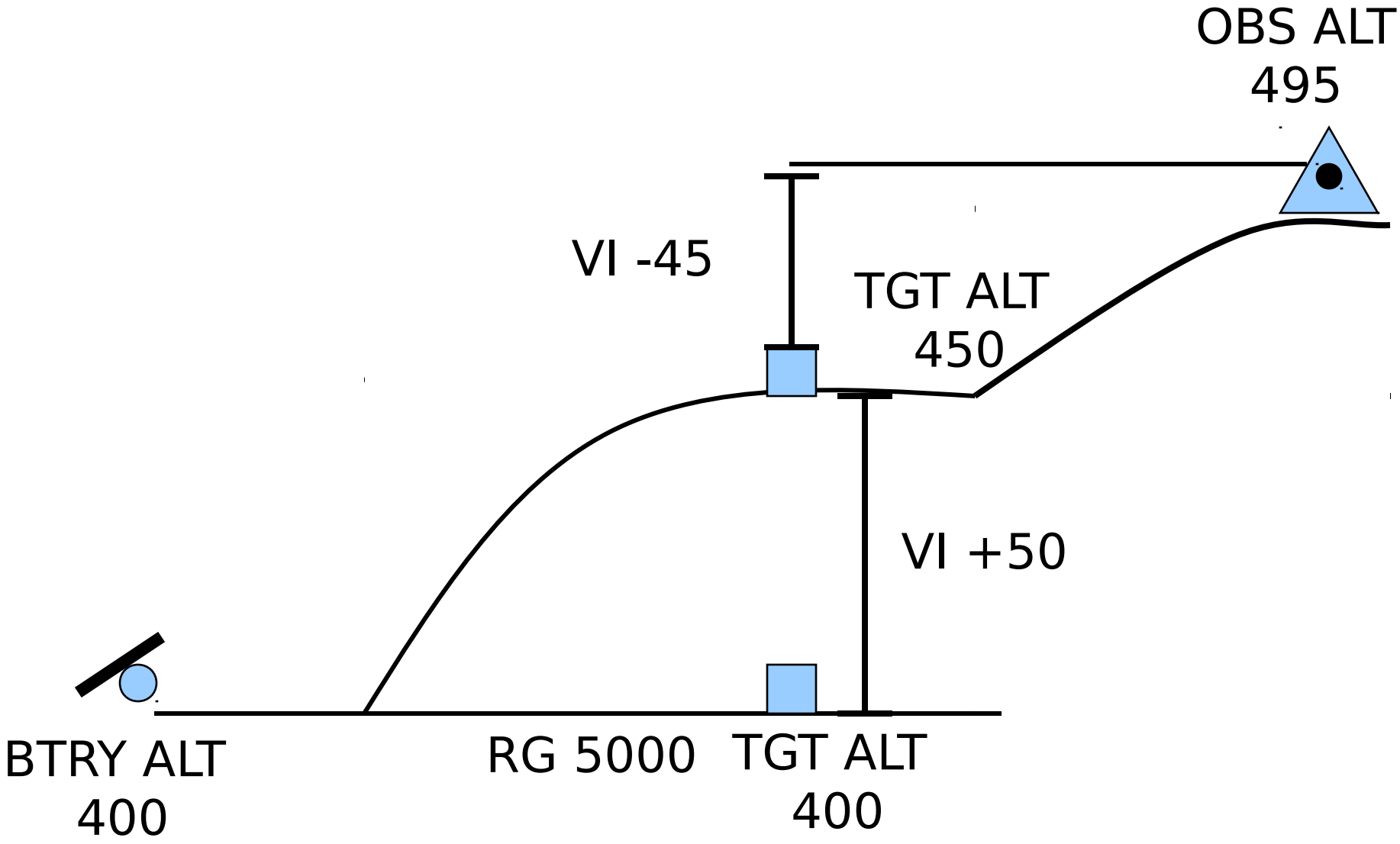
SITE IS THE ALGEBRAIC SUM OF ANGLE OF SITE AND COMPLIMENTARY ANGLE OF SITE





ELEVATION + SITE = QUADRANT ELEVATION
304 + +11 = 315




OBS ALT
495
VI -45
TGT ALT
450
VI +50
BTRY ALT
400
RG 5000
TGT ALT
400

VERTICAL ANGLE

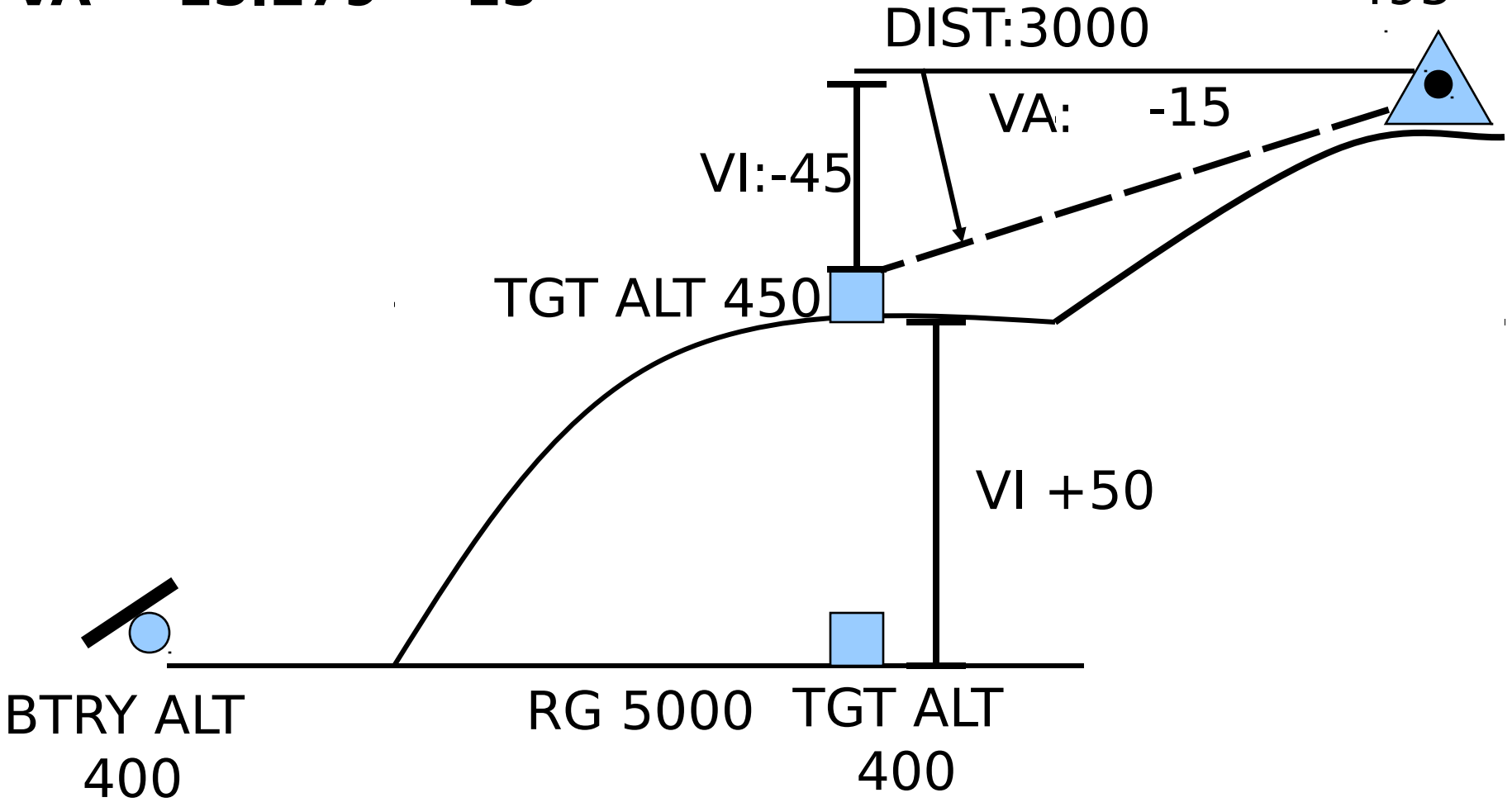
- **The smaller angle in a vertical plane from the horizontal to a straight line joining the observer and the target**
- **Essentially the same as angle of site, but from the perspective of the observer**
- **VA=[VI /(DIST/1000)*1.0186**

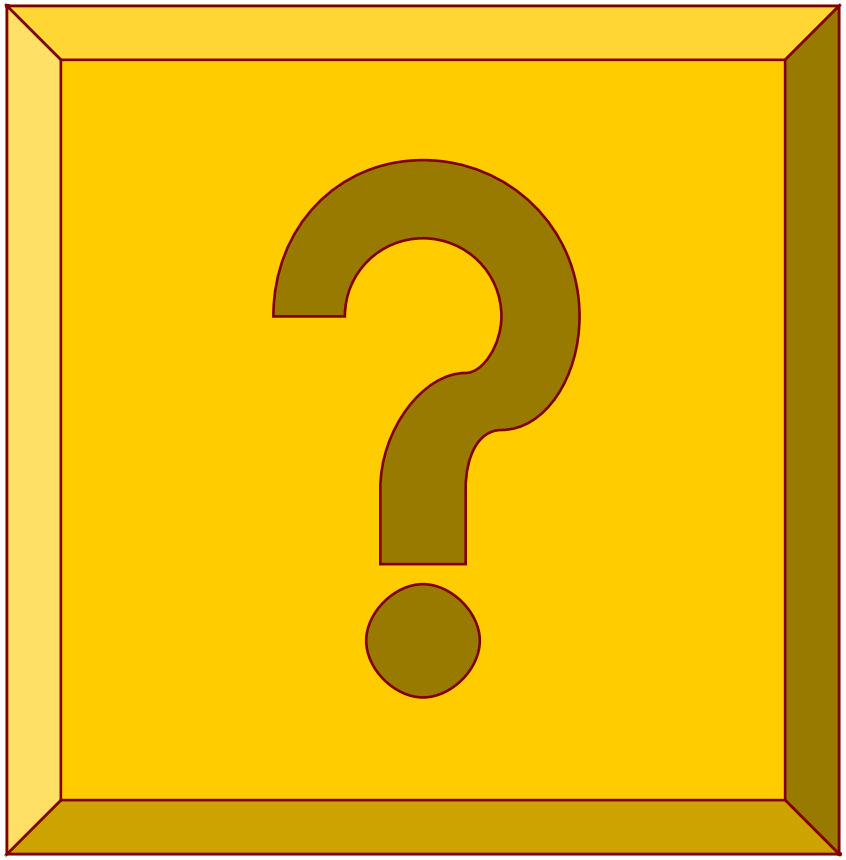
VA=[VI / (DIST/1000)] *1.0186

VA=[- 45 / 3] *1.0186

VA= -15 *1.0186

VA= -15.279~ -15





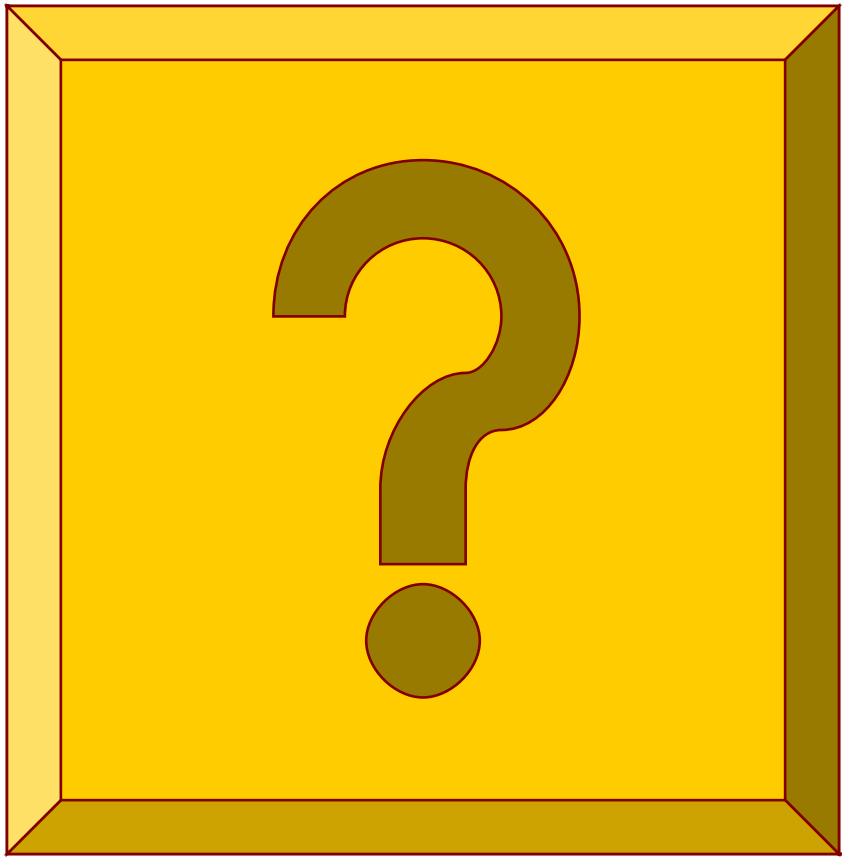
DETERMINE A VI WITH A VA

- THE OPPOSITE OF THE FORMULA FOR DETERMINIMG VA WITH VI
- VI=[VA* (DIST/1000)] /1.0186
- EXPRESSED TO THE NEAREST WHOLE METER
- CARRIES THE SIGN OF THE VA
- VI MUST ALWAYS EXCEED THE VA

OBSERVERS ALT	495
OBSERVERS VI (+/-)	-44
TARGET ALT	451
- BTRY ALT	400
BATTERY VI	+51

FORMULAS

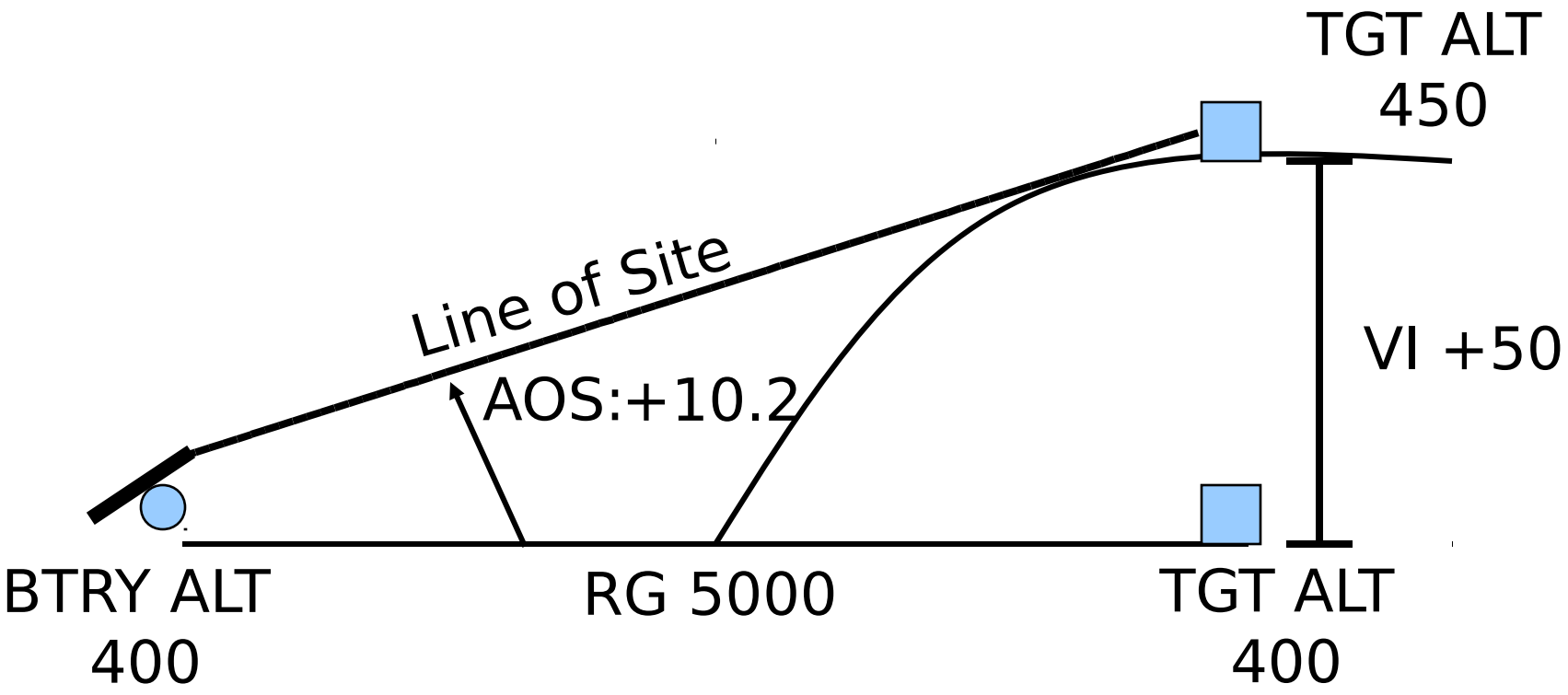
- **TGT ALT - BTRY ALT= VI**
- **AOS=[VI/(RG/1000)]*1.0186**
- **CAS=AOS*CSF**
- **SITE= AOS + CAS**
- **VA=[VI / (DIST/1000)]*1.0186**
- **VI=[VA* (DIST/1000)] /1.0186**

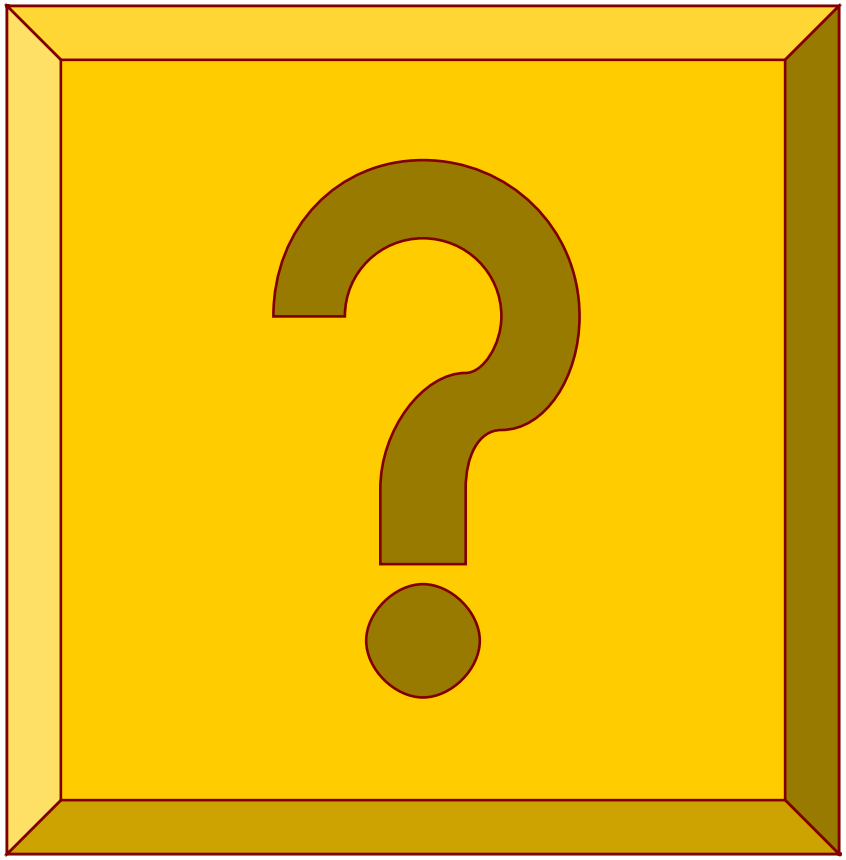


DETERMINE AOS USING GST

- **EST value of AOS: VI / (RG/1000) = AOS**
- **Place MHL over VI on “D” Scale**
- **Move slide until RG is under MHL on “C” Scale**
- **Read 3 digits from under M gaugepoint**
- **Place decimal to provide value close to EST**
- **Express to nearest tenth mil**
- **Carries the sign of the VI**

ANGLE OF SITE

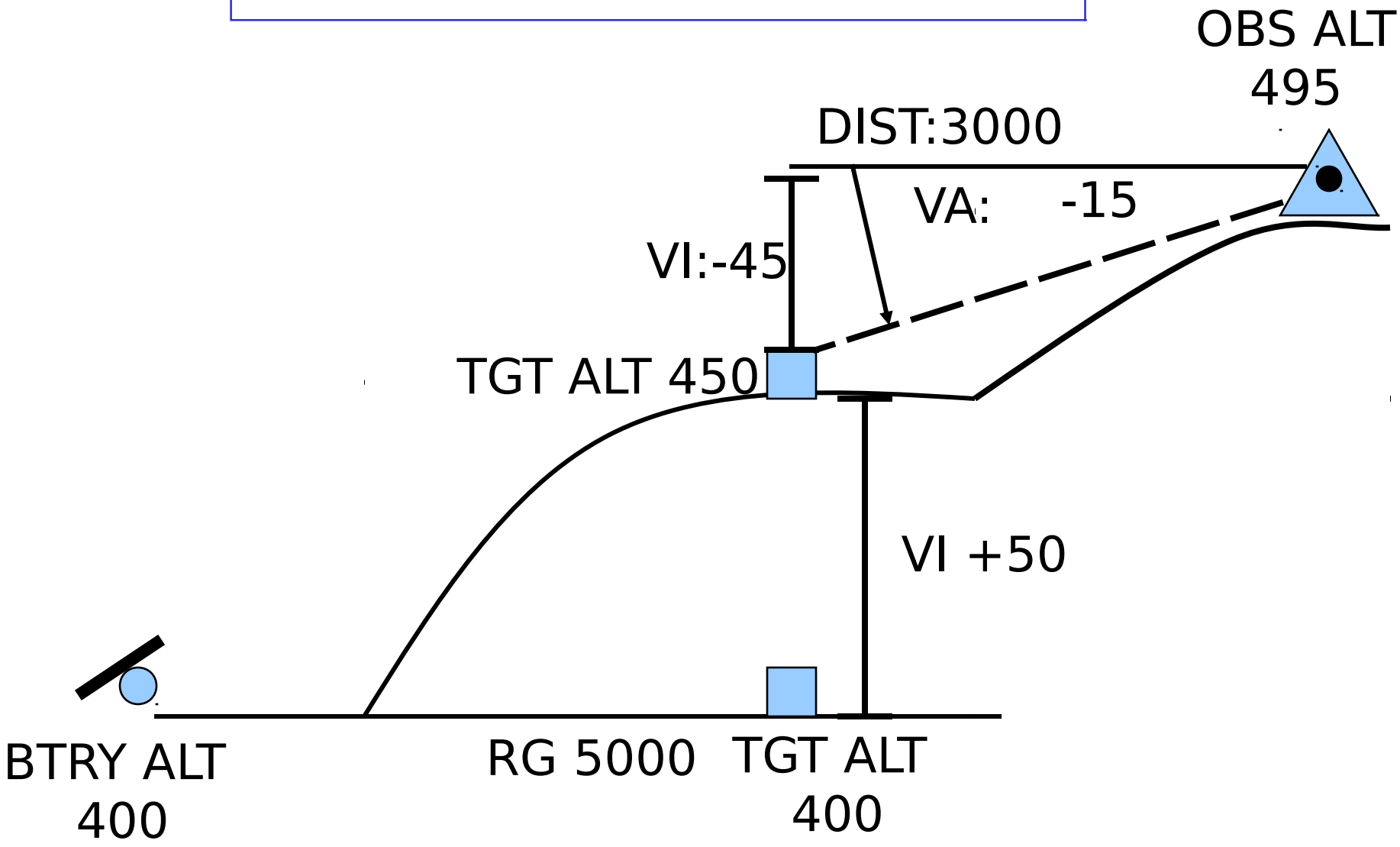


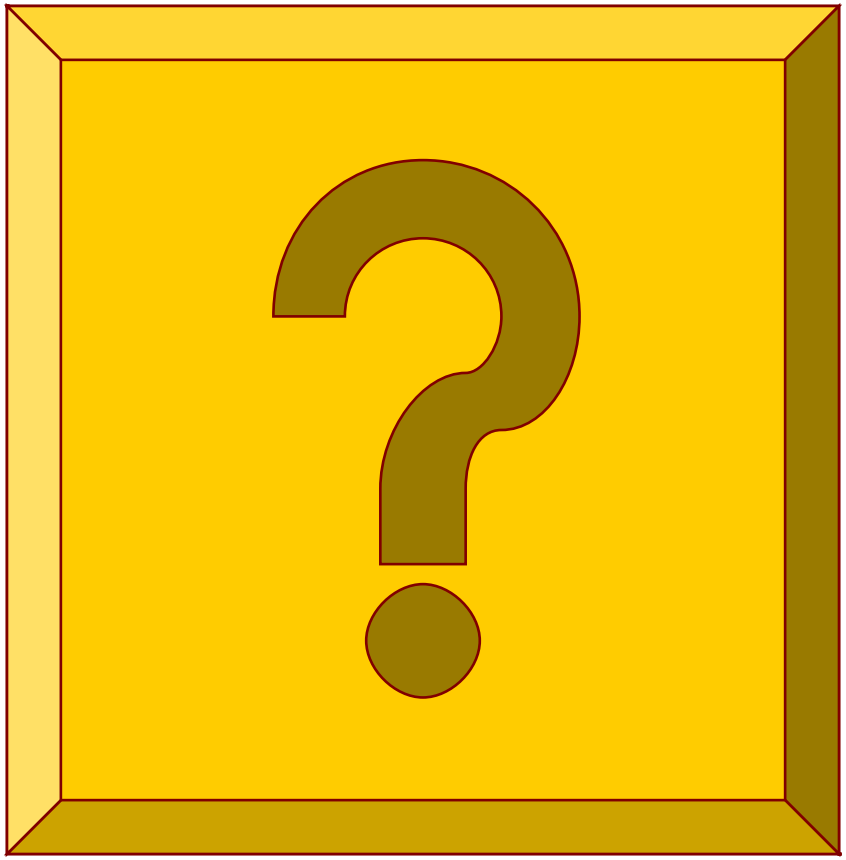


Determine VA using GST

- **EST value for VA: VI / (DIST/1000) = VA**
- **Place MHL over the VI on the “D” Scale**
- **Move slide until dist is under MHL on “C” Scale**
- **Read 3 digits from under M gaugepoint**
- **Place decimal to provide value close to EST**
- **Express to nearest mil**
- **Carries the sign of the VI**

VERTICLE ANGLE

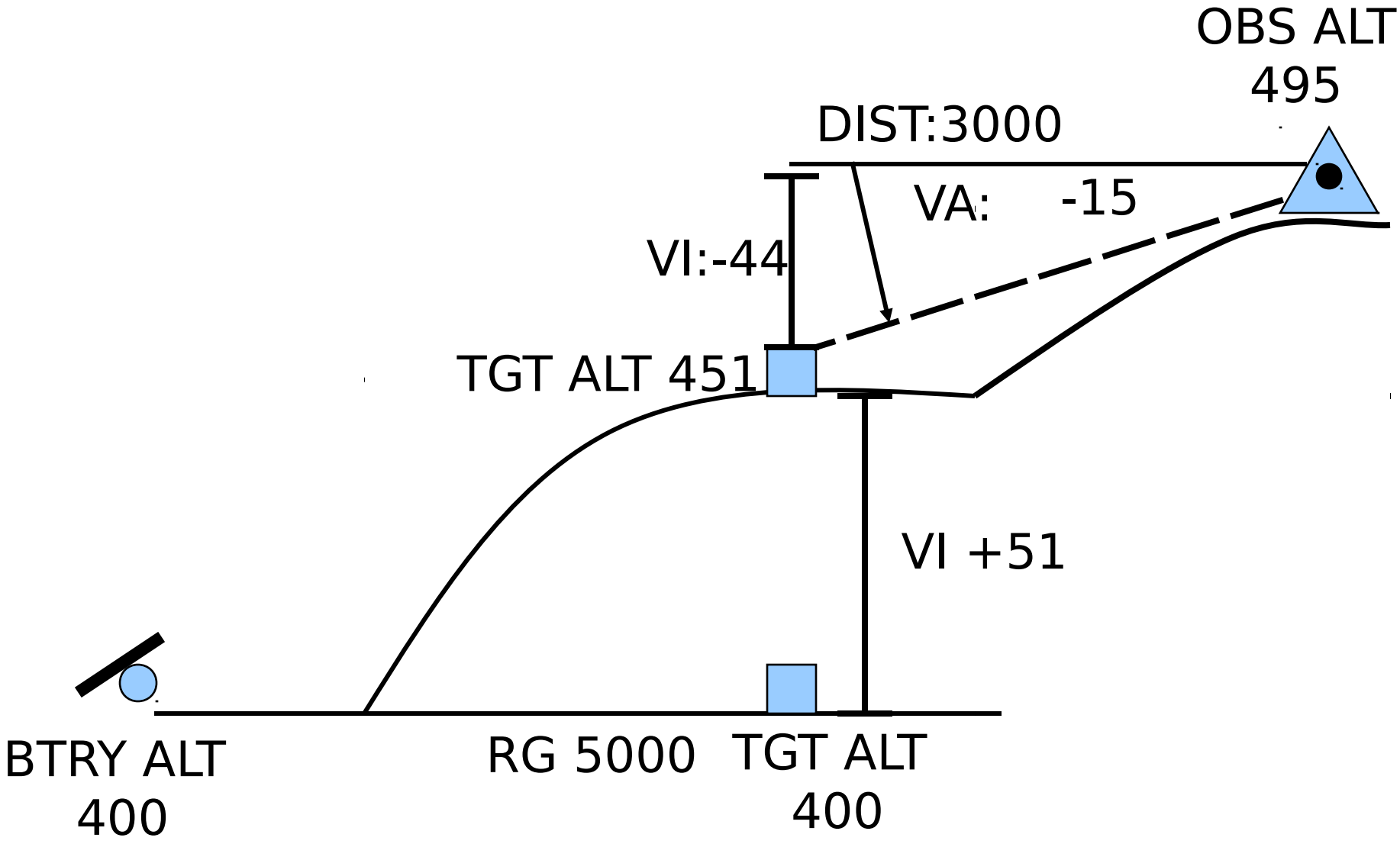


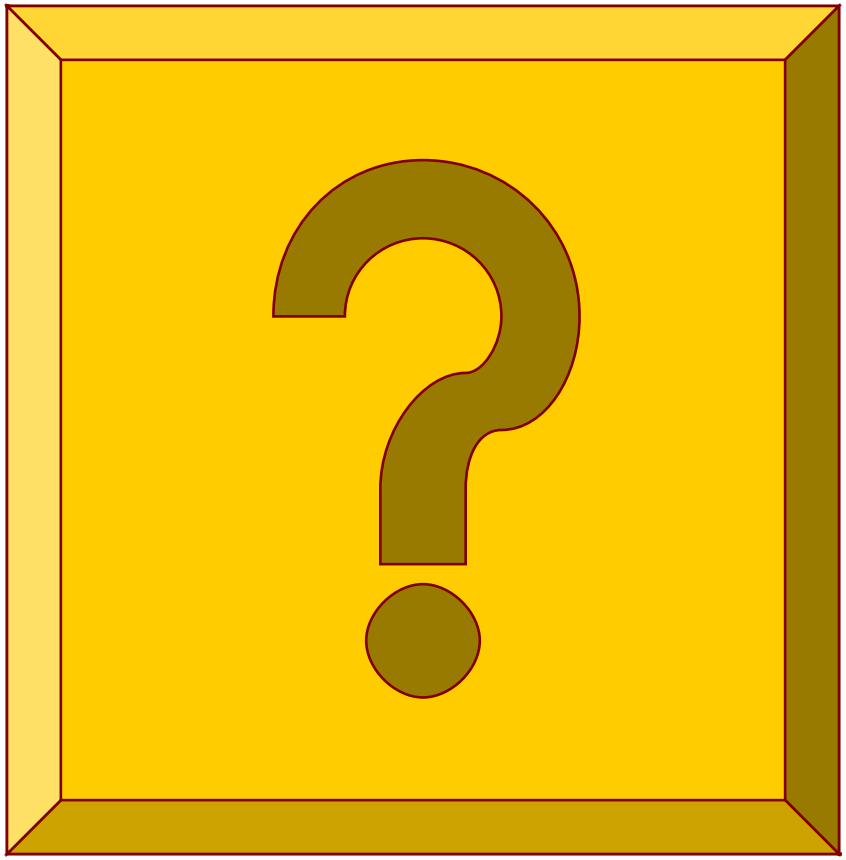


DETERMINE VI USING GST

- **EST value of VI: VA * (DIST\1000) = VI**
- **Place M gauge point over VA on “D” Scale**
- **Move MHL over Dist on “C” Scale**
- **Read 3 digits from under MHL on “D” Scale**
- **Place decimal to provide value close to EST**
- **Express to nearest Meter**
- **Carries the sign of the VA**

DETERMINE VI USING GST

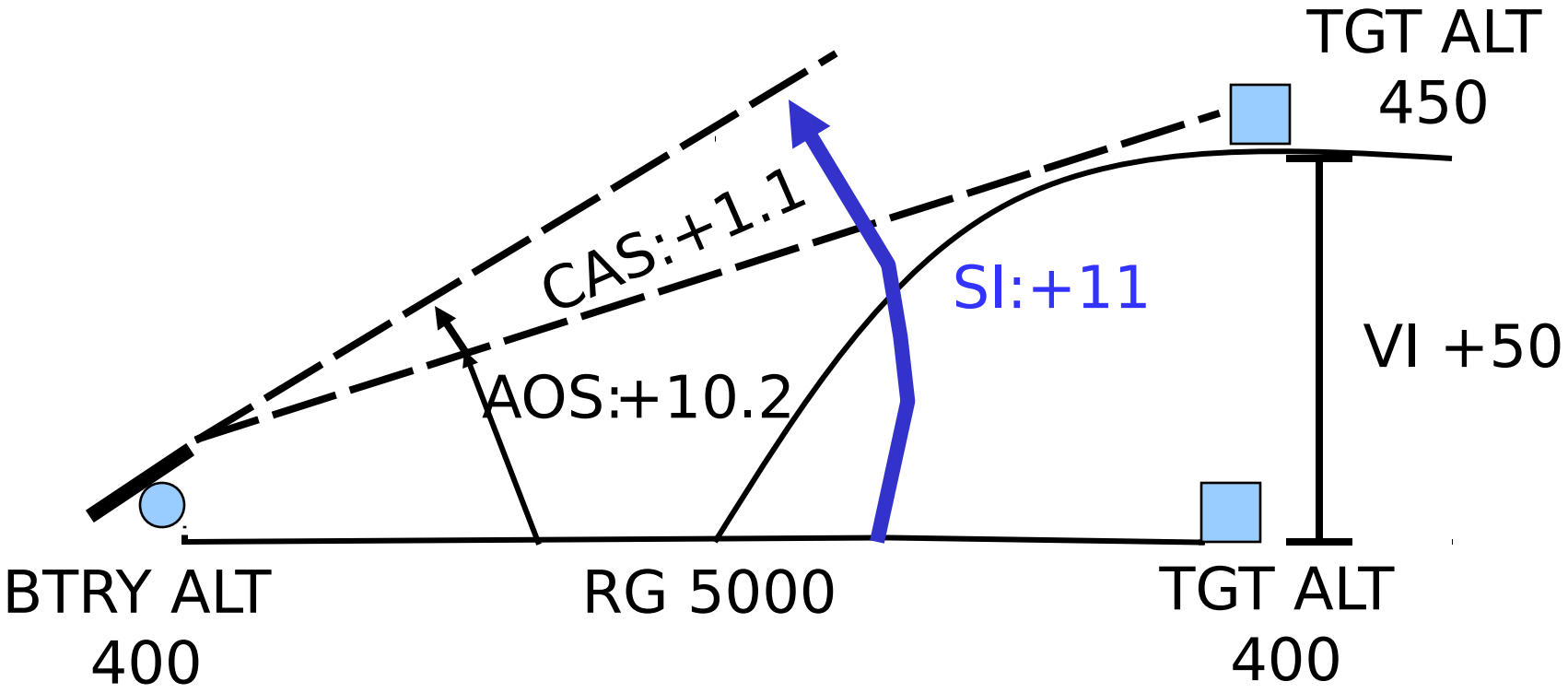




DETERMINE SITE USING GST

- EST value of SI, using formula for AOS
- Place MHL over VI on “D” Scale
- Move slide until RG is under MHL on the APPROPRIATE SI-RG Scale
- Read 3 digits from under M gaugepoint
- Place decimal to provide value close to EST
- Express to nearest mil
- Carries the sign of the VI

SITE


TGT ALT
450
CAS:+1.1
SI:+11
VI +50
AOS:+10.2
BTRY ALT
400
RG 5000
TGT ALT
400